

SIA Comments
To the EPA Docket on
Methylene Chloride and N-Methylpyrrolidone (NMP)

EPA Docket # EPA-HQ-OPPT-2016-0743

Submitted September 18, 2017

The Semiconductor Industry Association (SIA)¹ submits these comments to the U.S. Environmental Protection Agency (EPA) on Methylene Chloride and N-Methylpyrrolidone (NMP).

SIA previously submitted comments to EPA on the “Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: N-Methylpyrrolidone (NMP),” EPA Docket # EPA-HQ-OPPT-2016-0743, for EPA’s consideration in the “Scope of the Risk Evaluation for N-Methylpyrrolidone (2-Pyrrolidinone, 1-Methyl-)” (June 2017). SIA’s prior comments summarized the semiconductor industry’s uses of NMP, the absence of alternatives, the controls employed to minimize workplace exposures and environmental releases, and related information. Rather than repeating the points made in our prior comments, we incorporate our earlier comments by reference here.

These comments supplement our prior submission by providing additional data on occupational exposure of NMP in semiconductor fabrication facilities (“fabs”). The data, included as Attachment A to these comments, were originally submitted by the European Semiconductor Industry Association (ESIA) to the European Chemicals Agency (ECHA) as part of the consultation process on NMP. SIA member companies contributed to the submission of this data, and we have reviewed the data and determined it is accurate and representative of the exposure rates likely to be found at semiconductor fabs in the United States.

These data and our prior comments demonstrate that fabs employ a range of design features and practices that control uses of NMP and effectively eliminate worker and wafer exposure to NMP. Uses of NMP occur in automated and fully or semi-enclosed systems and maintenance activities are conducted by workers wearing personal protective equipment (PPE). In sum, the conditions of use of NMP in the semiconductor industry are carefully controlled and exposure to workers is below the recommended threshold limit values as documented by test data.

On the basis of the information SIA has previously submitted and as supplemented by the attached data, the weight of the evidence supports the conclusion that the opportunities for exposures to and releases of NMP in the semiconductor industry are minimal, and do not present an unreasonable risk. Consequently, these uses can reasonably be excluded from the scope of EPA’s upcoming Risk Evaluation for NMP. Doing so would allow EPA to focus its limited resources on evaluating other conditions of uses of NMP that are more likely to present

¹ SIA is the trade association representing leading U.S. companies engaged in the design and manufacture of semiconductors. Semiconductors are the fundamental enabling technology of modern electronics that has transformed virtually all aspects of our economy, ranging from information technology, telecommunications, health care, transportation, energy, and national defense. The U.S. is the global leader in the semiconductor industry, and continued U.S. leadership in semiconductor technology is essential to America’s continued global economic leadership. More information about SIA and the semiconductor industry is available at www.semiconductors.org.

risks. Eliminating the semiconductor industry's uses of NMP from further consideration also is consistent with the Agency's stated policy in the Final Risk Evaluation Rule:

EPA may, on a case-by- case basis, exclude certain activities that EPA has determined to be conditions of use in order to focus its analytical efforts on those exposures that are likely to present the greatest concern, and consequently merit an unreasonable risk determination. For example, EPA may, on a case-by-case basis, exclude uses that EPA has sufficient basis to conclude would present only "de minimis" exposures.

82 Fed. Reg. 33726, 33,729 (July 20, 2017).

SIA renews its request for the opportunity to meet with EPA to discuss the use of NMP in our industry. We seek to determine whether additional information is needed to properly characterize semiconductor industry uses of NMP so the Agency can confidently eliminate the conditions of use of this chemical in our industry from further consideration during its Risk Evaluation. In particular, SIA wishes to better understand why the Agency references semiconductor industry comments to the docket or specific semiconductor uses in the following categories:

- Solvent for Cleaning and Degreasing (p.21);
- Incorporation into formulation, mixture or reaction product (p.23);
- Paint additives and coating additives not described by other codes (p.25).

SIA questions whether it is appropriate to classify SIA member's use of NMP in these categories. We will be contacting EPA shortly to arrange a meeting.

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SIA appreciates the opportunity to submit these comments and we look forward to addressing them with you soon.

ATTACHMENT A

Annex to Response from European Semiconductor Industry Association (ESIA) to the ECHA Consultation on the draft recommendation of substances for inclusion in Annex XIV

Substance- 1-Methyl-2-pyrrolidone (NMP)

Brussels, May 31, 2017

Please find below a table on NMP occupational exposure measurement ranges submitted from the European Semiconductor Industry Association for consideration by the EU commission and ECHA as part of the consultation on the draft recommendation of substances for inclusion in annex XIV. This table has already been submitted to the REACH NMP restriction dossier considerations in 2013 and it is contained in the consolidated NMP Restriction proposal dossier in chapter B Table B.73. It remains applicable to the semiconductor industry and uses. It forms part of the worker exposure assessment in the REACH restriction dossier; *section B.9.3.2 Exposure estimation and subsection B.9.3.2.1 Workers exposure*

This input shows that any potential risk is very well managed in the semiconductor manufacturing industry. It also highlights that a REACH restriction with an occupation limit value approach is the much more appropriate and cost-effective method of regulation.

Table B.73: Semiconductor Activity Types, Descriptions and Reported Exposure Measurement ranges.

<u>Activity Type</u>	<u>Activity Description</u>	<u>Reported Exposure Measurement Range²</u>
Wafer Stripping ('cleaning') and removing processes routine operations	<ul style="list-style-type: none"> • In a closed processing system • Wafer stripping ('cleaning') removing photoresist • Organics removal 	<p>< DL³ to 0.202 mg/m³</p> <p>< DL to 50 ppb</p>
Solvent processes routine operations	<ul style="list-style-type: none"> • In a closed processing system • Photolithography layer spin on • Polyimide deposition 	<p>0.0247 to 0.857 mg/m³</p> <p>6 to 211 ppb</p>
Maintenance	<ul style="list-style-type: none"> • Preventive maintenance at process equipment tools in the cleanroom • Invasive maintenance 	<p>< DL to 0.770 mg/m³</p> <p>< DL⁴ to 190 ppb</p>
Chemical storage and handling	<ul style="list-style-type: none"> • Chemicals storage and delivery areas open to ambient air • Canister, bottle and container change at tools and chemfill stations not in the cleanroom 	<p>< DL to 4.054 mg/m³</p> <p>< DL⁵ to 1,000 ppb</p>

ppb is the industry measurement index. These figures have been converted into mg/m³

² Detection Limit (DL) depends on sampling time and analytical method.

³ DLs range from 4 to 400 ppb.

⁴ DLs range from 18 to 200 ppb.

⁵ DLs range from 0.3 to 250 ppb.

The performed sampling has used either flame ion detection (FID) or gas chromatograph-mass spectrometer (GC-MS). The sampling measurements have taken place between 2003 and 2012. These semiconductor industry air concentration measurements are based on personnel monitoring in the breathing zone. The semiconductor measured exposure levels are significantly lower order of magnitude than EU SCOEL (scientific committee on occupational exposure limits), such as SCOEL 8 hrs TWA (2007): 10 ppm / 10,000ppb
SCOEL 15 mins STEL (2007): 20 ppm / 20,000ppb